



#11

SEQUENCE LISTING

<110> Jin, Hong
Tang, Roderick
Li, Shengqiang
Bryant, Martin

<120> Recombinant RSV Expression Systems and Vaccines

<130> 7682-055-999

<140> 09/724,379

<141> 2000-11-28

<150> PCT/US98/20230

<151> 1998-09-28

<160> 51

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for the insertion of RSV/CAT gene into plasmid pUC19

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for the insertion of RSV/CAT gene into plasmid pUC19

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for the insertion of RSV/CAT gene into plasmid pUC19

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 <400> 5
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acatataggc atgcacc 17

<210> 17
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gcaaaatgga tcccatt 17

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taccaagagc tcgagtca 18

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<213> Respiratory Syncytial Virus (RSV)

<400> 28
acattagcgc atatggtaaa

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<210> 29
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20 25 30
Ser Tyr Ile Phe Asn Gly Pro Tyr Leu Lys Asn Asp Tyr Thr Asn Leu
35 40 45
Ile Ser Arg Gln Asn Pro Leu Ile Glu His Met Asn Leu Lys Lys Leu
50 55 60
Asn Ile Thr Gln Ser Leu Ile Ser Lys Tyr His Lys Gly Glu Ile Lys
65 70 75 80
Leu Glu Glu Pro Thr Tyr Phe Gln Ser Leu Leu Met Thr Tyr Lys Ser
85 90 95
Met Thr Ser Ser Glu Gln Ile Ala Thr Thr Asn Leu Leu Lys Lys Ile
100 105 110
Ile Arg Arg Ala Ile Glu Ile Ser Asp Val Lys Val Tyr Ala Ile Leu
115 120 125
Asn Lys Leu Gly Leu Lys Glu Lys Asp Lys Ile Lys Ser Asn Asn Gly
130 135 140
Gln Asp Glu Asp Asn Ser Val Ile Thr Thr Ile Ile Lys Asp Asp Ile
145 150 155 160
Leu Ser Ala Val Lys Asp Asn Gln Ser His Leu Lys Ala Asp Lys Asn
165 170 175
His Ser Thr Lys Gln Lys Asp Thr Ile Lys Thr Thr Leu Leu Lys Lys
180 185 190
Leu Met Cys Ser Met Gln His Pro Pro Ser Trp Leu Ile His Trp Phe
195 200 205
Asn Leu Tyr Thr Lys Leu Asn Ile Leu Thr Gln Tyr Arg Ser Asn
210 215 220
Glu Val Lys Asn His Gly Phe Thr Leu Ile Asp Asn Gln Thr Leu Ser
225 230 235 240
Gly Phe Gln Phe Ile Leu Asn Gln Tyr Gly Cys Ile Val Tyr His Lys
245 250 255
Glu Leu Lys Arg Ile Thr Val Thr Thr Tyr Asn Gln Phe Leu Thr Trp
260 265 270
Lys Asp Ile Ser Leu Ser Arg Leu Asn Val Cys Leu Ile Thr Trp Ile
275 280 285
Ser Asn Cys Leu Asn Thr Leu Asn Lys Ser Leu Gly Leu Arg Cys Gly
290 295 300
Phe Asn Asn Val Ile Leu Thr Gln Leu Phe Leu Tyr Gly Asp Cys Ile
305 310 315 320
Leu Lys Leu Phe His Asn Glu Gly Phe Tyr Ile Ile Lys Glu Val Glu
325 330 335
Gly Phe Ile Met Ser Leu Ile Leu Asn Ile Thr Glu Glu Asp Gln Phe
340 345 350
Arg Lys Arg Phe Tyr Asn Ser Met Leu Asn Asn Ile Thr Asp Ala Ala
355 360 365
Asn Lys Ala Gln Lys Asn Leu Leu Ser Arg Val Cys His Thr Leu Leu
370 375 380
Asp Lys Thr Val Ser Asp Asn Ile Ile Asn Gly Arg Trp Ile Ile Leu
385 390 395 400

Leu	Ser	Lys	Phe	Leu	Lys	Leu	Ile	Lys	Leu	Ala	Gly	Asp	Asn	Asn	Leu
				405					410					415	
Asn	Asn	Leu	Ser	Glu	Leu	Tyr	Phe	Leu	Phe	Arg	Ile	Phe	Gly	His	Pro
			420					425					430		
Met	Val	Asp	Glu	Arg	Gln	Ala	Met	Asp	Ala	Val	Lys	Ile	Asn	Cys	Asn
		435					440					445			
Glu	Thr	Lys	Phe	Tyr	Leu	Leu	Ser	Ser	Leu	Ser	Met	Leu	Arg	Gly	Ala
	450				455						460				
Phe	Ile	Tyr	Arg	Ile	Ile	Lys	Gly	Phe	Val	Asn	Asn	Tyr	Asn	Arg	Trp
465					470					475					480
Pro	Thr	Leu	Arg	Asn	Ala	Ile	Val	Leu	Pro	Leu	Arg	Trp	Leu	Thr	Tyr
				485					490					495	
Tyr	Lys	Leu	Asn	Thr	Tyr	Pro	Ser	Leu	Leu	Glu	Leu	Thr	Glu	Arg	Asp
			500					505					510		
Leu	Ile	Val	Leu	Ser	Gly	Leu	Arg	Phe	Tyr	Arg	Glu	Phe	Arg	Leu	Pro
		515					520					525			
Lys	Lys	Val	Asp	Leu	Glu	Met	Ile	Ile	Asn	Asp	Lys	Ala	Ile	Ser	Pro
	530					535					540				
Pro	Lys	Asn	Leu	Ile	Trp	Thr	Ser	Phe	Pro	Arg	Asn	Tyr	Met	Pro	Ser
545					550					555					560
His	Ile	Gln	Asn	Tyr	Ile	Glu	His	Glu	Lys	Leu	Lys	Phe	Ser	Glu	Ser
				565					570					575	
Asp	Lys	Ser	Arg	Arg	Val	Leu	Glu	Tyr	Tyr	Leu	Arg	Asp	Asn	Lys	Phe
			580					585					590		
Asn	Glu	Cys	Asp	Leu	Tyr	Asn	Cys	Val	Val	Asn	Gln	Ser	Tyr	Leu	Asn
		595					600					605			
Asn	Pro	Asn	His	Val	Val	Ser	Leu	Thr	Gly	Lys	Glu	Arg	Glu	Leu	Ser
	610					615					620				
Val	Gly	Arg	Met	Phe	Ala	Met	Gln	Pro	Gly	Met	Phe	Arg	Gln	Val	Gln
625					630					635					640
Ile	Leu	Ala	Glu	Lys	Met	Ile	Ala	Glu	Asn	Ile	Leu	Gln	Phe	Phe	Pro
				645					650					655	
Glu	Ser	Leu	Thr	Arg	Tyr	Gly	Asp	Leu	Glu	Leu	Gln	Lys	Ile	Leu	Glu
			660					665					670		
Leu	Lys	Ala	Gly	Ile	Ser	Asn	Lys	Ser	Asn	Arg	Tyr	Asn	Asp	Asn	Tyr
		675					680					685			
Asn	Asn	Tyr	Ile	Ser	Lys	Cys	Ser	Ile	Ile	Thr	Asp	Leu	Ser	Lys	Phe
	690					695					700				
Asn	Gln	Ala	Phe	Arg	Tyr	Glu	Thr	Ser	Cys	Ile	Cys	Ser	Asp	Val	Leu
705					710					715					720
Asp	Glu	Leu	His	Gly	Val	Gln	Ser	Leu	Phe	Ser	Trp	Leu	His	Leu	Thr
				725					730					735	
Ile	Pro	His	Val	Thr	Ile	Ile	Cys	Thr	Tyr	Arg	His	Ala	Pro	Pro	Tyr
			740					745					750		
Ile	Gly	Asp	His	Ile	Val	Asp	Leu	Asn	Asn	Val	Asp	Glu	Gln	Ser	Gly
	755						760					765			
Leu	Tyr	Arg	Tyr	His	Met	Gly	Gly	Ile	Glu	Gly	Trp	Cys	Gln	Lys	Leu
	770				775						780				
Trp	Thr	Ile	Glu	Ala	Ile	Ser	Leu	Leu	Asp	Leu	Ile	Ser	Leu	Lys	Gly
785					790					795					800
Lys	Phe	Ser	Ile	Thr	Ala	Leu	Ile	Asn	Gly	Asp	Asn	Gln	Ser	Ile	Asp
				805					810					815	
Ile	Ser	Lys	Pro	Ile	Arg	Leu	Met	Glu	Gly	Gln	Thr	His	Ala	Gln	Ala
			820					825					830		
Asp	Tyr	Leu	Leu	Ala	Leu	Asn	Ser	Leu	Lys	Leu	Leu	Tyr	Lys	Glu	Tyr
		835					840					845			
Ala	Gly	Ile	Gly	His	Lys	Leu	Lys	Gly	Thr	Glu	Thr	Tyr	Ile	Ser	Arg
	850					855					860				
Asp	Met	Gln	Phe	Met	Ser	Lys	Thr	Ile	Gln	His	Asn	Gly	Val	Tyr	Tyr
865					870					875					880
Pro	Ala	Ser	Ile	Lys	Lys	Val	Leu	Arg	Val	Gly	Pro	Trp	Ile	Asn	Thr
				885					890					895	

Ile	Leu	Asp	Asp	Phe	Lys	Val	Ser	Leu	Glu	Ser	Ile	Gly	Ser	Leu	Thr	900	905	910
Gln	Glu	Leu	Glu	Tyr	Arg	Gly	Glu	Ser	Leu	Leu	Cys	Ser	Leu	Ile	Phe	915	920	925
Arg	Asn	Val	Trp	Leu	Tyr	Asn	Gln	Ile	Ala	Leu	Gln	Leu	Lys	Asn	His	930	935	940
Ala	Leu	Cys	Asn	Asn	Lys	Leu	Tyr	Leu	Asp	Ile	Leu	Lys	Val	Leu	Lys	945	950	955
His	Leu	Lys	Thr	Phe	Phe	Asn	Leu	Asp	Asn	Ile	Asp	Thr	Ala	Leu	Thr	965	970	975
Leu	Tyr	Met	Asn	Leu	Pro	Met	Leu	Phe	Gly	Gly	Gly	Asp	Pro	Asn	Leu	980	985	990
Leu	Tyr	Arg	Ser	Phe	Tyr	Arg	Arg	Thr	Pro	Asp	Phe	Leu	Thr	Glu	Ala	995	1000	1005
Ile	Val	His	Ser	Val	Phe	Ile	Leu	Ser	Tyr	Tyr	Thr	Asn	His	Asp	Leu	1010	1015	1020
Lys	Asp	Lys	Leu	Gln	Asp	Leu	Ser	Asp	Asp	Arg	Leu	Asn	Lys	Phe	Leu	1025	1030	1035
Thr	Cys	Ile	Ile	Thr	Phe	Asp	Lys	Asn	Pro	Asn	Ala	Glu	Phe	Val	Thr	1045	1050	1055
Leu	Met	Arg	Asp	Pro	Gln	Ala	Leu	Gly	Ser	Glu	Arg	Gln	Ala	Lys	Ile	1060	1065	1070
Thr	Ser	Glu	Ile	Asn	Arg	Leu	Ala	Val	Thr	Glu	Val	Leu	Ser	Thr	Ala	1075	1080	1085
Pro	Asn	Lys	Ile	Phe	Ser	Lys	Ser	Ala	Gln	His	Tyr	Thr	Thr	Thr	Glu	1090	1095	1100
Ile	Asp	Leu	Asn	Asp	Ile	Met	Gln	Asn	Ile	Glu	Pro	Thr	Tyr	Pro	His	1105	1110	1115
Gly	Leu	Arg	Val	Val	Tyr	Glu	Ser	Leu	Pro	Phe	Tyr	Lys	Ala	Glu	Lys	1125	1130	1135
Ile	Val	Asn	Leu	Ile	Ser	Gly	Thr	Lys	Ser	Ile	Thr	Asn	Ile	Leu	Glu	1140	1145	1150
Lys	Thr	Ser	Ala	Ile	Asp	Leu	Thr	Asp	Ile	Asp	Arg	Ala	Thr	Glu	Met	1155	1160	1165
Met	Arg	Lys	Asn	Ile	Thr	Leu	Leu	Ile	Arg	Ile	Leu	Pro	Leu	Asp	Cys	1170	1175	1180
Asn	Arg	Asp	Lys	Arg	Glu	Ile	Leu	Ser	Met	Glu	Asn	Leu	Ser	Ile	Thr	1185	1190	1195
Glu	Leu	Ser	Lys	Tyr	Val	Arg	Glu	Arg	Ser	Trp	Ser	Leu	Ser	Asn	Ile	1205	1210	1215
Val	Gly	Val	Thr	Ser	Pro	Ser	Ile	Met	Tyr	Thr	Met	Asp	Ile	Lys	Tyr	1220	1225	1230
Thr	Thr	Ser	Thr	Ile	Ser	Ser	Gly	Ile	Ile	Ile	Glu	Lys	Tyr	Asn	Val	1235	1240	1245
Asn	Ser	Leu	Thr	Arg	Gly	Glu	Arg	Gly	Pro	Thr	Lys	Pro	Trp	Val	Gly	1250	1255	1260
Ser	Ser	Thr	Gln	Glu	Lys	Lys	Thr	Met	Pro	Val	Tyr	Asn	Arg	Gln	Val	1265	1270	1275
Leu	Thr	Lys	Lys	Gln	Arg	Asp	Gln	Ile	Asp	Leu	Leu	Ala	Lys	Leu	Asp	1285	1290	1295
Trp	Val	Tyr	Ala	Ser	Ile	Asp	Asn	Lys	Asp	Glu	Phe	Met	Glu	Glu	Leu	1300	1305	1310
Ser	Ile	Gly	Thr	Leu	Gly	Leu	Thr	Tyr	Glu	Lys	Ala	Lys	Lys	Leu	Phe	1315	1320	1325
Pro	Gln	Tyr	Leu	Ser	Val	Asn	Tyr	Leu	His	Arg	Leu	Thr	Val	Ser	Ser	1330	1335	1340
Arg	Pro	Cys	Glu	Phe	Pro	Ala	Ser	Ile	Pro	Ala	Tyr	Arg	Thr	Thr	Asn	1345	1350	1355
Tyr	His	Phe	Asp	Thr	Ser	Pro	Ile	Asn	Arg	Ile	Leu	Thr	Glu	Lys	Tyr	1365	1370	1375
Gly	Asp	Glu	Asp	Ile	Asp	Ile	Val	Phe	Gln	Asn	Cys	Ile	Ser	Phe	Gly	1380	1385	1390

Leu Ser Leu Met Ser Val Val Glu Gln Phe Thr Asn Val Cys Pro Asn
 1395 1400 1405
 Arg Ile Ile Leu Ile Pro Lys Leu Asn Glu Ile His Leu Met Lys Pro
 1410 1415 1420
 Pro Ile Phe Thr Gly Asp Val Asp Ile His Lys Leu Lys Gln Val Ile
 1425 1430 1435 1440
 Gln Lys Gln His Met Phe Leu Pro Asp Lys Ile Ser Leu Thr Gln Tyr
 1445 1450 1455
 Val Glu Leu Phe Leu Ser Asn Lys Thr Leu Lys Ser Gly Ser His Val
 1460 1465 1470
 Asn Ser Asn Leu Ile Leu Ala His Lys Ile Ser Asp Tyr Phe His Asn
 1475 1480 1485
 Thr Tyr Ile Leu Ser Thr Asn Leu Ala Gly His Trp Ile Leu Ile Ile
 1490 1495 1500
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 Gly Tyr Ile Thr Asp His Met Phe Ile Asn Leu Lys Val Phe Phe Asn
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 1570 1575 1580
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 1585 1590 1595 1600
 Val Lys Gly Cys His Ser Phe Lys Leu Trp Phe Leu Lys Arg Leu Asn
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 Val Ala Glu Phe Thr Val Cys Pro Trp Val Val Asn Ile Asp Tyr His
 1620 1625 1630
 Pro Thr His Met Lys Ala Ile Leu Thr Tyr Ile Asp Leu Val Arg Met
 1635 1640 1645
 Gly Leu Ile Asn Ile Asp Arg Ile His Ile Lys Asn Lys His Lys Phe
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 1665 1670 1675 1680
 Ser Asp Asn Thr His Leu Leu Thr Lys His Ile Arg Ile Ala Asn Ser
 1685 1690 1695
 Glu Leu Glu Asn Asn Tyr Asn Lys Leu Tyr His Pro Thr Pro Glu Thr
 1700 1705 1710
 Leu Glu Asn Ile Leu Ala Asn Pro Ile Lys Ser Asn Asp Lys Lys Thr
 1715 1720 1725
 Leu Asn Asp Tyr Cys Ile Gly Lys Asn Val Asp Ser Ile Met Leu Pro
 1730 1735 1740
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 1745 1750 1755 1760
 Asn Tyr Ser Lys Gln Asp Leu Tyr Asn Leu Phe Pro Met Val Val Ile
 1765 1770 1775
 Asp Arg Ile Ile Asp His Ser Gly Asn Thr Ala Lys Ser Asn Gln Leu
 1780 1785 1790
 Tyr Thr Thr Thr Ser His Gln Ile Ser Leu Val His Asn Ser Thr Ser
 1795 1800 1805
 Leu Tyr Cys Met Leu Pro Trp His His Ile Asn Arg Phe Asn Phe Val
 1810 1815 1820
 Phe Ser Ser Thr Gly Cys Lys Ile Ser Ile Glu Tyr Ile Leu Lys Asp
 1825 1830 1835 1840
 Leu Lys Ile Lys Asp Pro Asn Cys Ile Ala Phe Ile Gly Glu Gly Ala
 1845 1850 1855
 Gly Asn Leu Leu Leu Arg Thr Val Val Glu Leu His Pro Asp Ile Arg
 1860 1865 1870
 Tyr Ile Tyr Arg Ser Leu Lys Asp Cys Asn Asp His Ser Leu Pro Ile
 1875 1880 1885

Glu	Phe	Leu	Arg	Leu	Tyr	Asn	Gly	His	Ile	Asn	Ile	Asp	Tyr	Gly	Glu
1890						1895				1900					
Asn	Leu	Thr	Ile	Pro	Ala	Thr	Asp	Ala	Thr	Asn	Asn	Ile	His	Trp	Ser
1905					1910					1915					1920
Tyr	Leu	His	Ile	Lys	Phe	Ala	Glu	Pro	Ile	Ser	Leu	Phe	Val	Cys	Asp
				1925						1930				1935	
Ala	Glu	Leu	Ser	Val	Thr	Val	Asn	Trp	Ser	Lys	Ile	Ile	Ile	Glu	Trp
				1940				1945						1950	
Ser	Lys	His	Val	Arg	Lys	Cys	Lys	Tyr	Cys	Ser	Ser	Val	Asn	Lys	Cys
				1955				1960					1965		
Met	Leu	Ile	Val	Lys	Tyr	His	Ala	Gln	Asp	Asp	Ile	Asp	Phe	Lys	Leu
				1970				1975				1980			
Asp	Asn	Ile	Thr	Ile	Leu	Lys	Thr	Tyr	Val	Cys	Leu	Gly	Ser	Lys	Leu
1985					1990					1995					2000
Lys	Gly	Ser	Glu	Val	Tyr	Leu	Val	Leu	Thr	Ile	Gly	Pro	Ala	Asn	Ile
				2005						2010				2015	
Phe	Pro	Val	Phe	Asn	Val	Val	Gln	Asn	Ala	Lys	Leu	Ile	Leu	Ser	Arg
				2020					2025					2030	
Thr	Lys	Asn	Phe	Ile	Met	Pro	Lys	Lys	Ala	Asp	Lys	Glu	Ser	Ile	Asp
		2035					2040					2045			
Ala	Asn	Ile	Lys	Ser	Leu	Ile	Pro	Phe	Leu	Cys	Tyr	Pro	Ile	Thr	Lys
		2050				2055					2060				
Lys	Gly	Ile	Asn	Thr	Ala	Leu	Ser	Lys	Leu	Lys	Ser	Val	Val	Ser	Gly
2065					2070					2075					2080
Asp	Ile	Leu	Ser	Tyr	Ser	Ile	Ala	Gly	Arg	Asn	Glu	Val	Phe	Ser	Asn
				2085					2090					2095	
Lys	Leu	Ile	Asn	His	Lys	His	Met	Asn	Ile	Leu	Lys	Trp	Phe	Asn	His
			2100					2105					2110		
Val	Leu	Asn	Phe	Arg	Ser	Thr	Glu	Leu	Asn	Tyr	Asn	His	Leu	Tyr	Met
		2115					2120					2125			
Val	Glu	Ser	Thr	Tyr	Pro	Tyr	Leu	Ser	Glu	Leu	Leu	Asn	Ser	Leu	Thr
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Thr	Asn	Glu	Leu	Lys	Lys	Leu	Ile	Lys	Ile	Thr	Gly	Ser	Leu	Leu	Tyr
2145				2150						2155					2160
Asn	Phe	His	Asn	Glu											
				2165											

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 <213> Virus

<400> 30

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Ser	Tyr	Leu	Lys	Gly	Val	Ile	Ser	Phe	Ser	Glu	Cys	Asn	Ala	Leu	Gly
			20					25					30		
Ser	Tyr	Ile	Phe	Asn	Gly	Pro	Tyr	Leu	Lys	Asn	Asp	Tyr	Thr	Asn	Leu
		35					40					45			
Ile	Ser	Arg	Gln	Asn	Pro	Leu	Ile	Glu	His	Met	Asn	Leu	Lys	Lys	Leu
		50				55					60				
Asn	Ile	Thr	Gln	Ser	Leu	Ile	Ser	Lys	Tyr	His	Lys	Gly	Glu	Ile	Lys
65					70					75					80
Leu	Glu	Glu	Pro	Thr	Tyr	Phe	Gln	Ser	Leu	Leu	Met	Thr	Tyr	Lys	Ser
				85					90					95	
Met	Thr	Ser	Ser	Glu	Gln	Ile	Ala	Thr	Thr	Asn	Leu	Leu	Lys	Lys	Ile
			100					105					110		
Ile	Arg	Arg	Ala	Ile	Glu	Ile	Ser	Asp	Val	Lys	Val	Tyr	Ala	Ile	Leu
		115					120					125			
Asn	Lys	Leu	Gly	Leu	Lys	Glu	Lys	Asp	Lys	Ile	Lys	Ser	Asn	Asn	Gly
		130				135					140				
Gln	Asp	Glu	Asp	Asn	Ser	Val	Ile	Thr	Thr	Ile	Ile	Lys	Asp	Asp	Ile

145	Leu	Ser	Ala	Val	Lys	Asp	Asn	Gln	Ser	His	Leu	Lys	Ala	Asp	Lys	Asn
					165						170				175	
	His	Ser	Thr	Lys	Gln	Lys	Asp	Thr	Ile	Lys	Thr	Thr	Leu	Leu	Lys	Lys
				180					185					190		
	Leu	Met	Cys	Ser	Met	Gln	His	Pro	Pro	Ser	Trp	Leu	Ile	His	Trp	Phe
			195					200					205			
	Asn	Leu	Tyr	Thr	Lys	Leu	Asn	Asn	Ile	Leu	Thr	Gln	Tyr	Arg	Ser	Asn
		210					215					220				
	Glu	Val	Lys	Asn	His	Gly	Phe	Thr	Leu	Ile	Asp	Asn	Gln	Thr	Leu	Ser
225						230					235					240
	Gly	Phe	Gln	Phe	Ile	Leu	Asn	Gln	Tyr	Gly	Cys	Ile	Val	Tyr	His	Lys
				245						250					255	
	Glu	Leu	Lys	Arg	Ile	Thr	Val	Thr	Thr	Tyr	Asn	Gln	Phe	Leu	Thr	Trp
			260						265					270		
	Lys	Asp	Ile	Ser	Leu	Ser	Arg	Leu	Asn	Val	Cys	Leu	Ile	Thr	Trp	Ile
			275					280					285			
	Ser	Asn	Cys	Leu	Asn	Thr	Leu	Asn	Lys	Ser	Leu	Gly	Leu	Arg	Cys	Gly
		290					295					300				
	Phe	Asn	Asn	Val	Ile	Leu	Thr	Gln	Leu	Phe	Leu	Tyr	Gly	Asp	Cys	Ile
305						310					315					320
	Leu	Lys	Leu	Phe	His	Asn	Glu	Gly	Phe	Tyr	Ile	Ile	Lys	Glu	Val	Glu
				325						330					335	
	Gly	Phe	Ile	Met	Ser	Leu	Ile	Leu	Asn	Ile	Thr	Glu	Glu	Asp	Gln	Phe
			340						345					350		
	Arg	Lys	Arg	Phe	Tyr	Asn	Ser	Met	Leu	Asn	Asn	Ile	Thr	Asp	Ala	Ala
			355					360					365			
	Asn	Lys	Ala	Gln	Lys	Asn	Leu	Leu	Ser	Arg	Val	Cys	His	Thr	Leu	Leu
		370					375					380				
	Asp	Lys	Thr	Val	Ser	Asp	Asn	Ile	Ile	Asn	Gly	Arg	Trp	Ile	Ile	Leu
385						390					395					400
	Leu	Ser	Lys	Phe	Leu	Lys	Leu	Ile	Lys	Leu	Ala	Gly	Asp	Asn	Asn	Leu
				405						410					415	
	Asn	Asn	Leu	Ser	Glu	Leu	Tyr	Phe	Leu	Phe	Arg	Ile	Phe	Gly	His	Pro
			420					425					430			
	Met	Val	Asp	Glu	Arg	Gln	Ala	Met	Asp	Ala	Val	Lys	Ile	Asn	Cys	Asn
			435					440					445			
	Glu	Thr	Lys	Phe	Tyr	Leu	Leu	Ser	Ser	Leu	Ser	Met	Leu	Arg	Gly	Ala
		450					455					460				
	Phe	Ile	Tyr	Arg	Ile	Ile	Lys	Gly	Phe	Val	Asn	Asn	Tyr	Asn	Arg	Trp
465						470					475					480
	Pro	Thr	Leu	Arg	Asn	Ala	Ile	Val	Leu	Pro	Leu	Arg	Trp	Leu	Thr	Tyr
				485						490					495	
	Tyr	Lys	Leu	Asn	Thr	Tyr	Pro	Ser	Leu	Leu	Glu	Leu	Thr	Glu	Arg	Asp
			500						505					510		
	Leu	Ile	Val	Leu	Ser	Gly	Leu	Arg	Phe	Tyr	Arg	Glu	Phe	Arg	Leu	Pro
			515				520						525			
	Lys	Lys	Val	Asp	Leu	Glu	Met	Ile	Ile	Asn	Asp	Lys	Ala	Ile	Ser	Pro
		530					535					540				
	Pro	Lys	Asn	Leu	Ile	Trp	Thr	Ser	Phe	Pro	Arg	Asn	Tyr	Met	Pro	Ser
545						550					555					560
	His	Ile	Gln	Asn	Tyr	Ile	Glu	His	Glu	Lys	Leu	Lys	Phe	Ser	Glu	Ser
				565						570					575	
	Asp	Lys	Ser	Arg	Arg	Val	Leu	Glu	Tyr	Tyr	Leu	Arg	Asp	Asn	Lys	Phe
			580						585					590		
	Asn	Glu	Cys	Asp	Leu	Tyr	Asn	Cys	Val	Val	Asn	Gln	Ser	Tyr	Leu	Asn
			595					600					605			
	Asn	Pro	Asn	His	Val	Val	Ser	Leu	Thr	Gly	Lys	Glu	Arg	Glu	Leu	Ser
		610					615					620				
	Val	Gly	Arg	Met	Phe	Ala	Met	Gln	Pro	Gly	Met	Phe	Arg	Gln	Val	Gln
625						630					635					640
	Ile	Leu	Ala	Glu	Lys	Met	Ile	Ala	Glu	Asn	Ile	Leu	Gln	Phe	Phe	Pro

	1140		1145		1150
Lys Thr Ser Ala Ile Asp Leu Thr Asp Ile Asp Arg Ala Thr Glu Met					
Met Arg Lys Asn Ile Thr Leu Leu Ile Arg Ile Leu Pro Leu Asp Cys	1155	1160	1165		
Asn Arg Asp Lys Arg Glu Ile Leu Ser Met Glu Asn Leu Ser Ile Thr	1170	1175	1180		
Glu Leu Ser Lys Tyr Val Arg Glu Arg Ser Trp Ser Leu Ser Asn Ile	1185	1190	1195	1200	
Val Gly Val Thr Ser Pro Ser Ile Met Tyr Thr Met Asp Ile Lys Tyr	1205	1210	1215		
Thr Thr Ser Thr Ile Ser Ser Gly Ile Ile Ile Glu Lys Tyr Asn Val	1220	1225	1230		
Asn Ser Leu Thr Arg Gly Glu Arg Gly Pro Thr Lys Pro Trp Val Gly	1235	1240	1245		
Ser Ser Thr Gln Glu Lys Lys Thr Met Pro Val Tyr Asn Arg Gln Val	1250	1255	1260		
Leu Thr Lys Lys Gln Arg Asp Gln Ile Asp Leu Leu Ala Lys Leu Asp	1265	1270	1275	1280	
Trp Val Tyr Ala Ser Ile Asp Asn Lys Asp Glu Phe Met Glu Glu Leu	1285	1290	1295		
Ser Ile Gly Thr Leu Gly Leu Thr Tyr Glu Lys Ala Lys Lys Leu Phe	1300	1305	1310		
Pro Gln Tyr Leu Ser Val Asn Tyr Leu His Arg Leu Thr Val Ser Ser	1315	1320	1325		
Arg Pro Cys Glu Phe Pro Ala Ser Ile Pro Ala Tyr Arg Thr Thr Asn	1330	1335	1340		
Tyr His Phe Asp Thr Ser Pro Ile Asn Arg Ile Leu Thr Glu Lys Tyr	1345	1350	1355	1360	
Gly Asp Glu Asp Ile Asp Ile Val Phe Gln Asn Cys Ile Ser Phe Gly	1365	1370	1375		
Leu Ser Leu Met Ser Val Val Glu Gln Phe Thr Asn Val Cys Pro Asn	1380	1385	1390		
Arg Ile Ile Leu Ile Pro Lys Leu Asn Glu Ile His Leu Met Lys Pro	1395	1400	1405		
Pro Ile Phe Thr Gly Asp Val Asp Ile His Lys Leu Lys Gln Val Ile	1410	1415	1420		
Gln Lys Gln His Met Phe Leu Pro Asp Lys Ile Ser Leu Thr Gln Tyr	1425	1430	1435	1440	
Val Glu Leu Phe Leu Ser Asn Lys Thr Leu Lys Ser Gly Ser His Val	1445	1450	1455		
Asn Ser Asn Leu Ile Leu Ala His Lys Ile Ser Asp Tyr Phe His Asn	1460	1465	1470		
Thr Tyr Ile Leu Ser Thr Asn Leu Ala Gly His Trp Ile Leu Ile Ile	1475	1480	1485		
Gln Leu Met Lys Asp Ser Lys Gly Ile Phe Glu Lys Asp Trp Gly Glu	1490	1495	1500		
Gly Tyr Ile Thr Asp His Met Phe Ile Asn Leu Lys Val Phe Phe Asn	1505	1510	1515	1520	
Ala Tyr Lys Thr Tyr Leu Leu Cys Phe His Lys Gly Tyr Gly Lys Ala	1525	1530	1535		
Lys Leu Glu Cys Asp Met Asn Thr Ser Asp Leu Leu Cys Val Leu Glu	1540	1545	1550		
Leu Ile Asp Ser Ser Tyr Trp Lys Ser Met Ser Lys Val Phe Leu Glu	1555	1560	1565		
Gln Lys Val Ile Lys Tyr Ile Leu Ser Gln Asp Ala Ser Leu His Arg	1570	1575	1580		
Val Lys Gly Cys His Ser Phe Lys Leu Trp Phe Leu Lys Arg Leu Asn	1585	1590	1595	1600	
Val Ala Glu Phe Thr Val Cys Pro Trp Val Val Asn Ile Asp Tyr His	1605	1610	1615		
Pro Thr His Met Lys Ala Ile Leu Thr Tyr Ile Asp Leu Val Arg Met	1620	1625	1630		

2130	2135	2140
Thr Asn Glu Leu Lys	Lys Leu Ile Lys Ile	Thr Gly Ser Leu Leu Tyr
2145	2150	2155
Asn Phe His Asn Glu		2160
2165		

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 <213> Artificial Sequence

<220>
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<400> 31
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<210> 32
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<220>
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<210> 37
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<400> 37
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<400> 38
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<210> 39
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<400> 39
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<220>
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<210> 41
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<220>
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<210> 42
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<212> DNA
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<400> 42
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<210> 43
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<212> DNA
<213> Respiratory Syncytial Virus (RSV)

<400> 43
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<210> 44
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Designed primer sequences which incorporated Bgl II sites and gene start
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<400> 44
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 <210> 45
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 <212> DNA
 <213> Artificial Sequence

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 <400> 46
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 <210> 47
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 <210> 50
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 <213> Respiratory Syncytial Virus (RSV)

 <400> 50
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 <210> 51
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 <400> 51

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19